

## **RECORDING PRIMARY AND SAP AUDIO FROM A BROADCAST SIGNAL WITH A DVD RECORDER**

### **FIELD OF THE INVENTION**

5           The present invention relates generally to DVD recording, and more particularly to recording primary and SAP audio from an NTSC signal onto recording media.

### **BACKGROUND OF THE INVENTION**

10           A secondary audio program signal is broadcast along with a television signal and its primary audio. The second channel, known as a Second Audio Program, SAP, is monaural and relatively lo-fi. SAP may be enabled through either a television, a stereo VCR equipped to receive SAP signals, or an SAP receiver. The secondary audio program channel may be used for a variety of enhanced programming, including providing a "video description" of a program's key visual elements, , that describes  
15           actions not otherwise reflected in the dialog, used by visually impaired viewers. The descriptive voice-over is inserted in natural pauses in the program so as not to interfere with dialogue, music and sound effects. Many movies and TV programs are described are provided with enhanced descriptions provided through in the secondary audio program channel. Government agencies must caption their videos and multimedia  
20           presentations for people who are deaf or hearing impaired, and describe those same presentations for people who are blind or visually impaired. The secondary audio program channel allows broadcasters to provide their programs in a language other than English, and may be used to receiver weather information, or other forms of "real-time" information.

25           Most standard stereo televisions TVs, video cassette recorders VCRs digital video disk recorders DVD+R are equipped with a feature that enables you to receive secondary audio program SAP content. This is usually a button/switch on the control panel or on the remote control and is most commonly labeled: SAP, MTS, Audio 2, or Audio B. Currently, the consumer must select ahead of time which of the two audio  
30           signals will be recorded along with the video recorded by the digital video disk recorder DVD+R . A consumer cannot always know ahead of time whether the secondary audio

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program content broadcasted along with a video program is desirable to record at the expense of not recording the primary audio content associated with the video program content.

Accordingly, there is a need to allow both the primary audio signal content  
5 associated with a video program and secondary audio program content to be recorded so a consumer can then select between the primary and secondary audio content during playback of a recording.

#### SUMMARY OF THE INVENTION

10 A method includes receiving audio components of a signal, enabling recording of a first audio component of the signal as a mono audio component and recording a second audio component of the signal as a second mono audio component, and enabling recording of the first audio component as stereo audio components when only the first audio component is contained in the signal.

15 A controller in a recording apparatus enables receiving audio components of a signal, enabling recording of a first audio component of the signal as a mono audio component and recording a second audio component of the signal as a second mono audio component, and enabling recording of the first audio component as stereo audio components when only the first audio component is contained in the signal.

20 A method includes receiving a broadcast signal, recording of a primary audio component of the broadcast signal as a mono audio encoded stream and recording a secondary audio program component of the broadcast signal as a second mono encoded stream when both the primary audio and the secondary audio program components are within the broadcast signal and selected to be recorded, and recording of the primary  
25 audio component of the broadcast signal as a stereo encoded stream when only the primary audio component is within the broadcast signal and as a stereo audio signal.

#### BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the present invention may be obtained from  
30 consideration of the following description in conjunction with the drawings, in which:

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FIG. 1 depicts an exemplary digital video disk recorder configuration for carrying out the inventive recording of both primary audio content and secondary audio program content provided with a broadcast signal, and

FIG. 2 is a flow diagram of a method for carrying out the inventive recording of  
5 both primary audio content and secondary audio program content provided with a broadcast signal.

To facilitate understanding, identical reference numerals have been used, where possible, to designate identical elements that are common to the figures.

## 10 DETAILED DESCRIPTION

FIG. 1 depicts an exemplary digital video disk recorder configuration 100 for carrying out the inventive recording of both primary audio content and secondary audio program content provided with a broadcast signal. A broadcast signal is received at a tuner block 102 where the video and audio content is decoded and the audio content is  
15 digitized to provide video, left and right stereo components of audio associated with the video and the secondary audio program content. The decoded video and digitized stereo audio and secondary audio program components are then compressed and encoded at the audio/video compression encoder block 103. The controller block 101 selectively controls recording of the compressed and encoded video, primary left and right audio  
20 components and secondary audio program content by a disk drive 104 onto disk media 110. If the DVD recorder's controller has been set to automatically record secondary audio program content when it is available, the DVD recorder would record the primary audio as a mono encoded stream and the secondary audio program content as a second, separate mono encoded audio stream.. In the case that the SAP audio is not broadcast  
25 then the DVD recorder's controller 101 would only enable recording the primary audio as either a stereo or mono (if stereo is not broadcast) encoded stream. If a user doesn't set the DVD recorder to record the secondary audio program content then the controller enables only the primary audio to be recorded by the disk drive 104 as either a stereo or mono encoded stream.

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During playback mode, enabled by the controller 101, the recorded video and audio is decoded at and audio/video compression decoder block 105, from which the video content is encoded 106 for viewing on a display device 108. Recorded audio from the audio/video decoder block 105 is converted to analog form and played by the speakers. Where both primary stereo audio and secondary audio program content were available and recorded, each audio component is available during playback on the speakers 109 as mono audio content. Where secondary audio program content was not available during recording of the video content, the primary audio content was recorded as stereo left and right components for playback at left and right audio outputs to speakers 109. Where secondary audio program content was not available and primary audio was broadcast as a mono audio signal then that mono audio signal was recorded and available for playback from the disk recorder as a mono audio signal.

Referring to Figure 2, there is shown a flow chart 200 of a method for controlled recording of primary audio content and secondary audio program content associated with broadcast video programming. If decoded video and audio signals 201 include secondary audio program content 202 then the disk drive is controlled to record the primary audio and secondary audio SAP each as a mono encoded stream. When the secondary audio program SAP signal was not present for decoding, and the primary audio signal was received and decoded as stereo left and right audio components 204 to the video broadcast, then the primary audio is recorded by the disk drive as encoded left and right audio components 205. When the primary audio was broadcast as a monaural audio component to the video broadcast, then the audio is recorded as a mono encoded stream 206.

Although various embodiments which incorporate the teachings of the present invention have been shown and described in detail in the context of a digital video disk recorder, those skilled in the art can readily devise many other varied embodiments that will still incorporate these teachings.